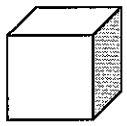
Mrs. Hayden

Name_____ Date_____

201 Areas and Volumes—Prisms and Cylinders

1. Find the total area and volume of a cube with an edge of length = 3.

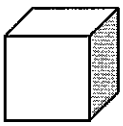


$SA = 6 \cdot 3^2 = 54 u^2$ (Six Squares)

$V = 3 \cdot 3 \cdot 3$

$V = 27 u^2$

2. Find the total area and volume of a cube with an edge of length = 6.

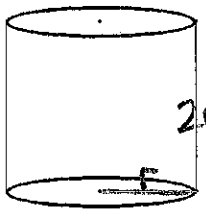


$SA = 6 \cdot 6^2$

$216 u^2$

$V = 216 u^3$

3. The volume of a cylinder is 36π cm^3. The height is equal to 2 x radius. What is the radius?



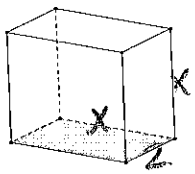
$36\pi = \pi r^2 \cdot 2r$

$36 = 2r^3$

$18 = r^3$

$r = 2.6$ cm

4. The lateral area of a rectangular prism is 48 in^2. The height is equal to the length. The width is 2 in. What is the volume of the prism?



$LA = ph$

$2(x+2)x$

$LA = 2x^2 + 4x$

$2x^2 + 4x = 48$

$x^2 + 2x - 24 = 0$

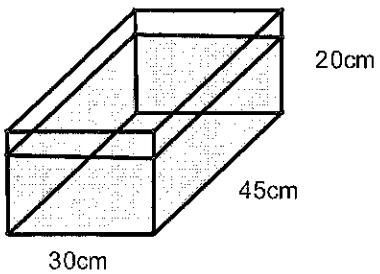
$(x+6)(x-4) = 0$

$x = -6 \quad x = 4$

$V = 2 \cdot 4 \cdot 4$

32 in^3

5. A fish tank is filled with water. The dimensions of the water are shown. When a rock is submerged, the water level rises 2cm. What is the volume of the rock?



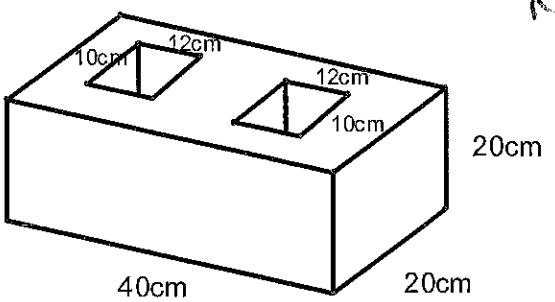
$V_{w/o} = 30 \cdot 45 \cdot 20 = 27000$ cm^3

$V_w = 30 \cdot 45 \cdot 22 = 29700$ cm^3

29700
−27000
2700 cm^3

Volume of Rock

6. Find the volume and surface area of the cement block shown.



$V_B - 2V_{Hole}$

$V_B = 40 \cdot 20 \cdot 20 = 16000$ cm^3

$V_H = 10 \cdot 12 \cdot 20 = 2400$ cm^3

$16000 - 2(2400) = 11{,}200$ cm^3

$SA = LA$ of Big Brick $+ 2(LA_{\text{small Brick}}) + 2(A_{\text{rect}} - 2 \cdot A_{\text{sm Rect}})$

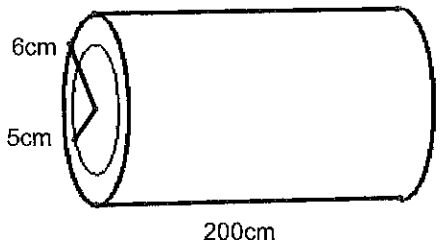
$= 120 \cdot 20 \quad 2(44 \cdot 20) + 2(40 \cdot 20 - 2(120))$

$800 - 240$

$2400 + 1760 + 1120$

$SA = 5280$ cm^2

7. A pipe is 200cm long and has an inside radius of 5cm and an outside radius of 6cm. How many cubic cm of metal are in the pipe?



$V_{outer} - V_{inner}$

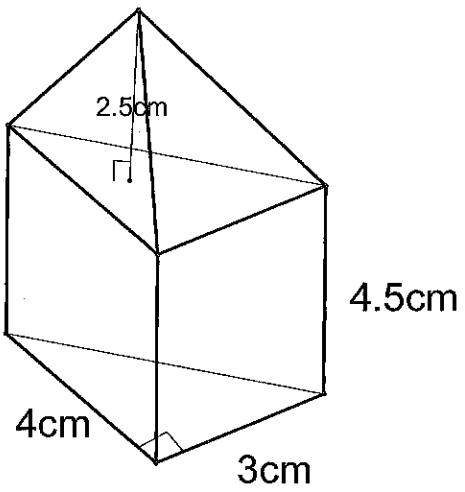
$36\pi(200) - 25\pi(200)$

$2200\pi\ cm^3$

$\approx 6911.5\ cm^3$

8. Find the volume of the solid to the right.

(The volume of the pyramid is $5cm^3$.)



$V_{Prism} = \frac{1}{2}(3)(4)(4.5)$

27

$V_{pyr} + V_{prism}$

$5 + 27 = 32\ cm^3$

9. The volume of a triangular prism is $48\sqrt{3}cm^3$. The base is an equilateral triangle with one side = 8cm. What is the height of the prism?

$V = Bh$

$B = \frac{8^2\sqrt{3}}{4} = 16\sqrt{3}$

$48\sqrt{3} = 16\sqrt{3} \cdot h$

$3\ cm = h$

10. The total surface area of a square prism is $180m^2$. The perimeter of the base is 20m. What is the height of the prism?

$P = 20$

$\frac{P}{5}$

$B = 25$

$SA = LA + 2B$

$20 \cdot h + 2(25) = 180$

$20h = 130$

$h = 6.5\ cm$

11. Two pipes of the same length have diameters 6cm and 8cm. These two pipes are replaced by a single pipe of the same length, which has the same capacity as the smaller pipes combined. What should the diameter of the new pipe be?

$r = 3 \quad r = 4$

$V = 9\pi h + 16\pi h$

$V = 25\pi h$

$r = 5\ cm$

$d = 10\ cm$

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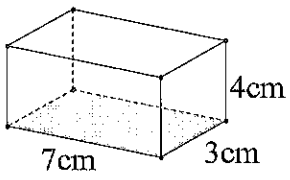
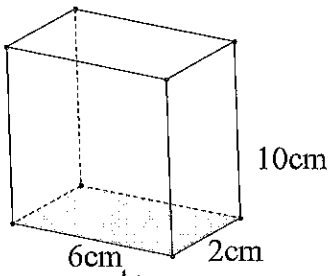
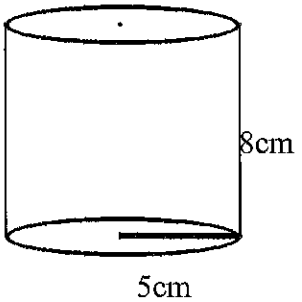
Please find the following: perimeter of the base = p, area of the base = B, LA, SA, and V.



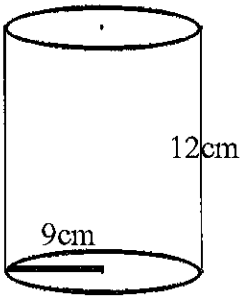
12. p = 20 cm
B = 21 cm²
LA = 80 cm²
SA = 122 cm²
V = 84 cm³



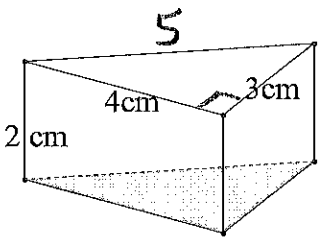
13. p = 16cm
B = 12cm²
LA = 160cm²
SA = 184cm²
V = 120cm³



14. C = 10π cm
B = 25π cm²
LA = 80π cm²
SA = 130π cm²
V = 200π cm³

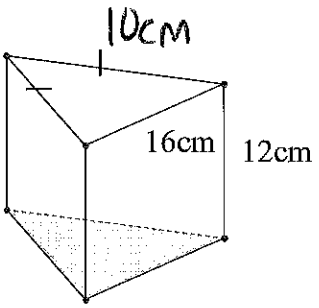


15. C = 18π cm
B = 81π cm²
LA = 216π cm²
SA = 378π cm²
V = 972π cm³



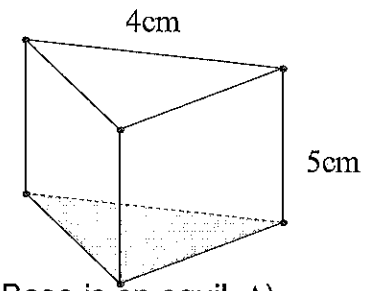
(Base is a rt. Δ)

16. p = 12cm
B = 6cm²
LA = 24cm²
SA = 36cm²
V = 12cm³



(Base is an isosceles Δ)

17. p = 36cm
B = 48cm²
LA = 432cm²
SA = 528cm²
V = 576cm³



(Base is an equil. Δ)

18. p = 12cm
B = 4√3cm²
LA = 60cm²
SA = 73.9cm²
V = 34.6cm³